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1. (a) The total decibel gain of a three-stage system is 120 dB. Determine the decibel gain of each stage if the second stage has twice the decibel gain of the first and the third has 2.7 times the decibel gain of the first.
(b) Determine the voltage gain of each stage.
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2. If the applied ac power to a system is 5W at 100mV and the output power is 48W, determine:
- (a) The power gain in decibels.
 - (b) The voltage gain in decibels if the output impedance is 40 k Ω .
 - (c) The input impedance
 - (d) The output voltage.
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3. For the network of Fig.1:
- a) Determine the mathematical expression for the magnitude of the ratio V_o / V_i .
 - b) Using the results of part (a), determine V_o / V_i at 100 Hz, 1 kHz, 2 kHz, 5 kHz, and 10 kHz, and plot the resulting curve for the frequency range of 100 Hz to 10 kHz. Use a log scale.
 - c) Determine the break frequency.
 - d) Sketch the asymptotes and locate the -3-dB point.
 - e) Sketch the frequency response for V_o / V_i and compare to the results of part (b).
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4. For the network of Fig. 1:
- a) Determine the mathematical expression for the angle by which V_o leads V_i .
 - b) Determine the phase angle at f 100 Hz, 1 kHz, 2 kHz, 5 kHz, and 10 kHz, and plot the resulting curve for the frequency range of 100 Hz to 10 kHz.
 - c) Determine the break frequency.
 - d) Sketch the frequency response off or the same frequency spectrum of part (b) and compare results.
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5. a- Determine the critical frequencies associated with the low-frequency response of the BJT amplifier in Fig.2. Which is the dominant critical frequency? Sketch the Bode plot.
b- Determine the voltage gain r at one-tenth of the dominant critical frequency, at the dominant critical frequency, and at ten times the dominant critical frequency for the low-frequency response .
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6. For the network of Fig. 3:
- a) Determine r_e .
 - b) Find $A_{v_{mid}} = V_o / V_i$.
 - c) Calculate Z_i .

- d) Find $A_{v_{mid}} = V_o/V_s$.
- e) Determine f_{L_s} , f_{L_c} , and f_{L_E} .
- f) Determine the low cutoff frequency.
- g) Sketch the asymptotes of the Bode plot defined by the cutoff frequencies of part (e)

7. Determine the critical frequencies associated with the low-frequency response of the FET amplifier in Figure 4. Indicate the dominant critical frequency and draw the Bode plot.

8. Find the voltage gain of the amplifier in Figure 4 at the following frequencies: f_c , $0.1f_c$, and $10f_c$, where f_c is the dominant critical frequency.

